

NATIONAL LEAD COMPANY

NEW YORK, 111 BROADWAY
BALTIMORE, 214 W. HENRIETTA ST.
BUFFALO, 116 OAK ST.

NATIONAL-BOSTON LEAD CO., 800 ALBANY ST.
BOSTON
GEORGIA LEAD WORKS, EAST & BISHOPS STS.
ATLANTA

ST. LOUIS, 722 CHESTNUT ST.
GIBSON & PRICE, SWETLAND
BUILDING, CLEVELAND
NATIONAL LEAD & OIL CO. OF PA., 316
FOURTH AVE., PITTSBURGH
JOHN T. LEWIS & BROS. CO., WIDENER BUILDING, PHILADELPHIA

CHICAGO, 900 WEST 18th ST.
CINCINNATI, 639 FREEMAN AVE.
CLEVELAND, 820 W. SUPERIOR AVE.

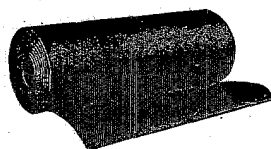


Sheet Lead and Lead Pipe

PRODUCTS

Antimonial Sheet Lead
Chemical Sheet Lead
Crawlproof (Reinforced) Sheet Lead
Tellurium Sheet Lead
Antimonial Lead Pipe
Chemical Lead Pipe
Tellurium Lead Pipe

Other products of National Lead Company include:
solder, babbitt metal, burning lead, traps and bends, ingot
lead, block tin pipe, block tin sheet, tin-lined lead pipe,
lead wool, lead wire, lead washers, expansion bolts, red-
lead, white-lead, litharge, linseed oil.



SHEET LEAD

Sheet lead of our manufacture is in use in many plants
throughout the country and may be depended upon to
render satisfactory service in withstanding the action of
ammonia gas, phosphoric acid, sulphuric acid, electrolytic
solutions, etc. We are in a position to supply four kinds
of sheet lead—antimonial, chemical, crawlproof or rein-
forced, and tellurium. Choosing the particular type to
best meet requirements in a given case is a matter of de-
termining the service conditions. In this connection, the
advice of our technical staff is always available. Simply
get in touch with our nearest office.

ANTIMONIAL SHEET

Antimonial sheet lead is lead alloyed with various per-
centages of antimony to impart hardness and other
desired properties. It possesses a high degree of acid re-
sistance. Its elastic limit is five times that of chemical
lead, its tensile strength double, and it also has a lower
specific gravity.

We can supply antimonial sheet in any gauge or
thickness desired down to $\frac{1}{64}$ " and can furnish sheets, in
some weights, as large as 8' by 25'.

CHEMICAL SHEET

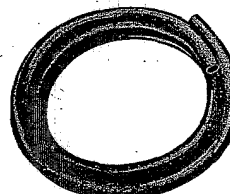
Our chemical sheet lead is made from the best grades
of Missouri chemical lead, insuring the proper composi-
tion to give maximum acid-resisting qualities. Uniform
in thickness and free from irregularities, it is furnished
in any gauge from $\frac{1}{64}$ " up.

CRAWLPROOF SHEET

This is a chemical lead sheet reinforced inside with
antimonial lead supporting bars. Designed especially to
prevent buckling, stretching and wrinkling. Supplied in
any thickness from $\frac{1}{32}$ " up and in any size sheet not ex-
ceeding 8' in width by 25' in length.

TELLURIUM LEAD SHEET

This is a new type of lead with distinct advantages.
Laboratory and plant tests indicate that it is superior to
other types in resistance to sulphuric acid corrosion,
tensile strength, mechanical toughness and vibration or
fatigue resistance. Can be easily worked and burned to-
gether like ordinary lead. Supplied in a wide variety
of thicknesses and sheet sizes.



LEAD PIPE

We make antimonial, chemical and tellurium lead pipe.
Only high quality materials are used and our pipe will
be found to be of proper wall thickness, thus insuring
correct weight per foot. Supplied in sizes up to 12" in-
side diameter and in various wall thicknesses. Catalog
listing pipe sizes furnished on request.

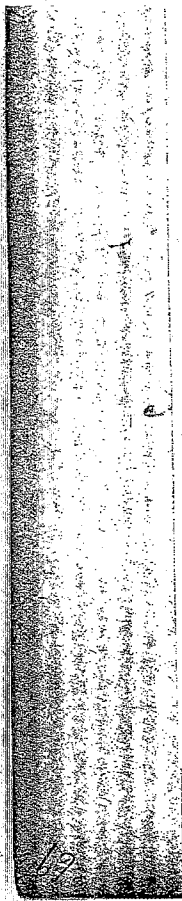
GENERAL

We are always glad to advise regarding lead installa-
tions and to estimate costs of materials based on blue
prints or specifications.

In ordering sheet lead please state desired thickness
or weight per foot, width and length. If irregular sheets
are required, please send sketch giving dimensions or
provide a sketch, including dimensions, of the tank to be
lined.

N 28179

0000-NLI-000014523



111 Broadway, New York, N. Y.

Lined Products Department

PRODUCTS

Homogeneous Lead Lined Vacuum Apparatus, Evaporators, Tanks, Steam Jacketed Kettles, Digesters, Autoclaves, Agitators, Pressure Stills, Treater Drums and Car Tanks. Homogeneous Lead Covered Heating or Cooling Coils.

ADVANTAGES OF PROCESS

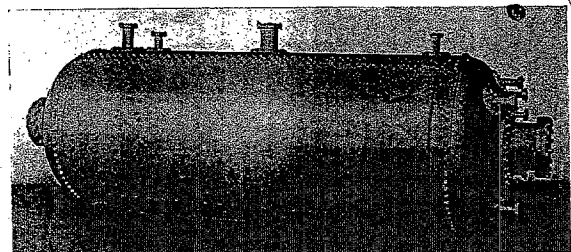
The lead lining or covering is of a uniform thickness and inseparably bonded to the steel, copper or brass, forming a flawless and impervious surface.

A strip covered with lead by our process can be mechanically twisted to destruction without the slightest

shearing action between the lead and the other metal, which effectively demonstrates why this type of equipment stands up so well under severe conditions.

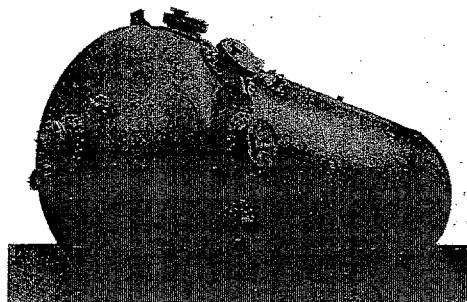
We guarantee the homogeneous lead linings or coverings to be so attached to the steel, copper or brass that the two metals are inseparable under vacuum, pressure and temperature change close up to the melting point of lead.

We solicit your specifications and in this connection the services of our Engineering Staff are at your disposal.

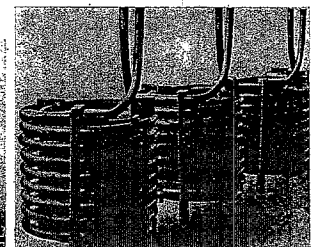
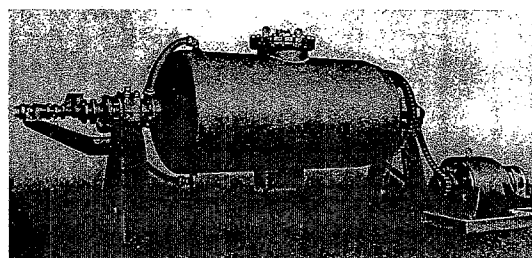


Steam Jacketed Homogeneous Lead Lined Treating Drum, 6' in diameter and 18' long. Also subjected to vacuum

(Right)
Homogeneous Lead Lined Treating Drum for oil refining, 10' in diameter and 20' long



(Below)
Homogeneous Lead Lined Extractor



Homogeneous Chemical Lead Covered Heating Coils. Guaranteed for 150 lbs. Steam Pressure

NATIONAL LEAD COMPANY

Atlantic Branch

111 Broadway, New York, N. Y.

Lined Products Department

PRODUCTS

"United" Chemical Lead Lined:

Pipe, Fittings, Valves, Tank Connections.

"United" Hard Lead:

Acid Pumps, Fittings, Valves, Plug Cocks, Bibbs.

"United" Tin Lined:

Pipe, Fittings, Valves, Tank Connections, Pumps.

SERVICE

Our Engineering Department offers its services to anyone having acid contact problems to solve. If blue prints or sketches are submitted we will be pleased to offer suggestions in detail as to the most economical and satisfactory use of "United" Lined Products.

"UNITED TUBOND" CHEMICAL LEAD LINED STEEL PIPE AND FLANGED FITTINGS

"United Tubond" Chemical Lead Lined Pipe is lined with a seamless chemical lead tube inseparably bonded to the outer casing. This gives an absolutely uniform lining and a smooth interior surface with friction reduced to a minimum; free from porous or defective spots.

Flanged pipe is made up with the bonded chemical lead lining made on to the face of the recessed flange, which gives a positive lead-to-lead joint at each flange.

"UNITED" HARD LEAD OR TIN LINED ACID VALVES

"United" Acid Valves are heavily lined throughout with hard lead or pure block tin, and being constructed of iron, offer the strength of the cast iron valve with full acid resisting qualities.

Furnished in all required sizes and styles: globe, gate, angle, check, diaphragm and free flow "Y" type; also special valves according to specifications.

"United" Acid Valves are always tight when closed, and by seating at the top when opened, pressure is taken from the stuffing box.

The "United" Hard Lead Lined Wedge Type Gate Pattern Flanged Acid Valve is a most efficient gate pattern of acid valve. It is designed for work where a drip-proof valve is necessary. This valve is positively tight when closed. The wedge is recessed to take a bakelite or rubber disc on the wet side. The use of either disc eliminates any rubbing or abrasive action. A perfect seat is assured at all times.



"United" Chemical Hard Lead Lined Wedge Type Flanged Acid Gate Valve

"UNITED" HARD LEAD "CHEM-RAYON" FLANGED ACID VALVES

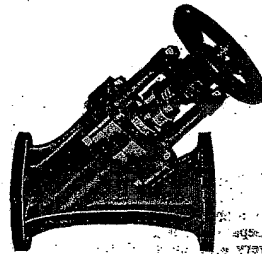
"United" Hard Lead Chem-Rayon Y or Angle Type Flanged Acid Valve has a bonnet of steel and brass which is completely covered with hard lead with the exception of the hand wheel and bushing support.

The protected bonnet does away with the necessity of frequent costly replacements.

The body is of solid hard lead with reinforcing fins cast integral, affording maximum strength while reducing the weight to a minimum.

In place of the lead plug or disc, a renewable rubber plug can be supplied.

"United" Hard Lead Acid Valves can be furnished in the same pattern as "United" Lined Valves, i. e., Y, Angle, Gate, etc., as well as special sizes and types according to specifications.

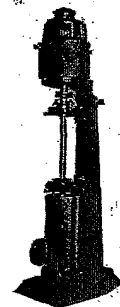


"United" Hard Lead Chem-Rayon Y or Angle Type Flanged Acid Valve

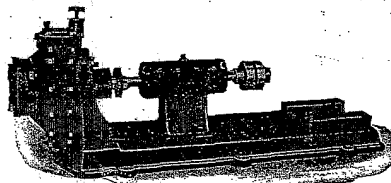
"UNITED" ACID PUMPS

The worthwhile feature of the vertical pump is the elimination of the packing gland. The boot serves as both suction chamber and auxiliary supply tank.

"United" Horizontal Pumps are self-lubricating with large internal grease glands supplied by compression cups. The casing is of hard lead with the impeller of the same alloy cast around a reinforcing spider.



Vertical Hard Lead Centrifugal Acid Pump (Packingless Type)



"Horizontal" Hard Lead Centrifugal Acid Pump

NATIONAL LEAD COMPANY

Atlantic Branch

Acid Recovery Department

111 Broadway, New York, N. Y.

PRODUCTS

Concentrating Plants for

Sludge Acid

Spent Acid

Chamber Acid

Separating Plants for

Sludge Acid

Evaporators for

Weak Solutions of Sulphuric and Phosphoric Acid

PROCESS

The Simonson-Mantius Vacuum Process, patented in the United States and foreign countries, has been adopted by a large number of oil refineries for the concentration of separated sludge acid, by chemical plants for the recovery of spent acids, and by chamber acid plants for the concentration of weak chamber acid.

The salient feature of this process is that the work is carried on under high vacuum with indirect application of heat. The use of vacuum has very decided advantages, as it eliminates all fumes and leakage, materially decreases acid losses and reduces fuel consumption by lowering the boiling point of the acid and radiation losses.

By this process sulphuric acid can be concentrated to 66° Be. in a SUPER VACUUM Concentrator using a steam pressure of from 100 to 150 lbs. and a vacuum of 29.7". The application of such high vacuum practically eliminates all losses due to foaming. The concentration to a lower strength of 61 or 62° Be. does not require the installation of a special vacuum booster, and the work can be accomplished with a steam pressure of 45 lbs.

Concentrators can be equipped with our electric level indicator which insures perfect control of operation at all times.

APPLICATION OF PROCESS

Oil Refineries—The weak acid coming from the separators at a density of from 25° to 45° Be. is concentrated by our process to 56°, 61° or 66° Be. Where necessary the partially concentrated acid of 56° Be. is allowed to settle so as to remove tarry matter which has been separated by the decomposition of sulphonic acids, and then further concentrated to 66° Be.

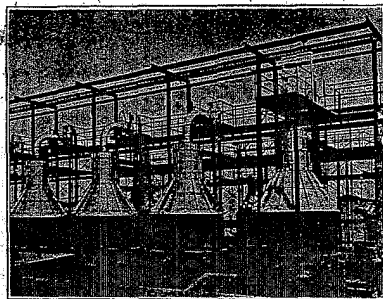
The 61° Be. acid can be used without further concentration for the treating of light oils and pressure distillates, or it can be reinforced with oleum to an acid of higher density and then used for treating kerosenes and lubricating oils.

In refineries requiring 98% acid for the treatment of their oils, the 61° acid is used for the absorption of SO₂ produced in a contact plant.

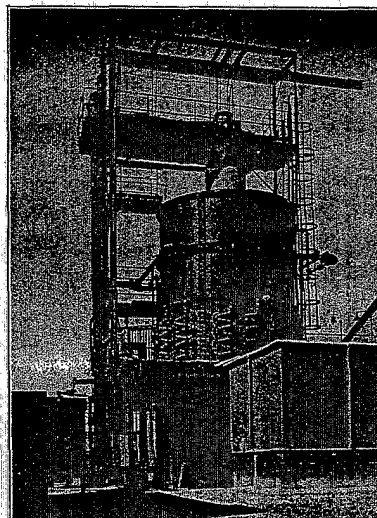
Under normal conditions the total cost of concentrating from 30 to 66° Be. will vary from \$3 to \$6 per ton of finished acid, and the concentration to 61° Be. only will cost from \$1.50 to \$3 per ton.

Operating costs depend on the size of the plant and the figures given are exclusive of overhead and depreciation.

Chemical Plants—Many chemical factories use large quantities of sulphuric acid in the manufacture of their products, and this acid can be recovered and concentrated



Concentrator at Extreme Right is a Type B Super Vacuum; Others Are Regular Type B Concentrators



Super Vacuum Concentrator Capacity: 100 tons of 66° Be. Acid per Day

economically by the Simonson-Mantius Vacuum Process to any desired density up to 66° Be. However, spent acids should be practically free from nitric acid to prevent excessive corrosion of the lead vapor lines and condenser.

Chamber Acid Plants—Sulphuric acid manufactured by the standard lead chamber process has a density of from 56 to 58° Be., and therefore requires further concentration to 66° Be. This work can be done economically under vacuum, as the fuel consumption is low and the loss of acid very small compared with losses usually encountered in the old-fashioned pan and bench or tower system.

Under normal conditions the 56° acid can be concentrated to 66° Be. at a total cost of from \$1 to \$1.50 per ton of 66° acid.

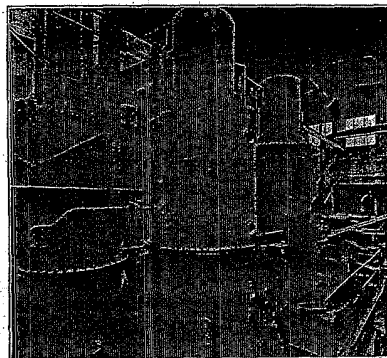
High Concentration—Chamber acid and clean spent acid can be concentrated in our Super Vacuum Type Concentrators to an acidity of 95% or 96% H_2SO_4 at very reasonable cost and with extremely low loss.

SEPARATING PLANTS FOR SLUDGE ACID

We are prepared to design and furnish complete plants for the separation of sludge acid; where necessary, we also build special equipment for the complete absorption of all fumes and odors coming from separating plants.

EVAPORATORS

We are building single and double effect evaporators for the recovery of dilute solutions of sulphuric and phosphoric acids; also for sulphuric acid solutions containing sodium, nickel, copper, or iron sulphate.



Types A and D Concentrators.

INSTALLATIONS

We have in operation or under construction the following plants:

	Units
Anglo-Persian Oil Company.....	1
Atlantic Refining Company.....	4
Bethlehem Steel Company.....	1
Canadian Copper Refiners, Ltd.....	1
Canadian Industries, Ltd.....	1
Carbide & Carbon Chemicals Corp.....	4
Carnegie Steel Company.....	1
Cities Service Refining Co.....	1
Davison Chemical Company.....	1
E. I. DuPont de Nemours Co., Inc.....	13
Empire Refineries.....	2
Empire Oil & Refining Company.....	1
Grasselli Powder Company.....	1
Gulf Refining Company.....	19
Hard Chemical Works.....	1
Hercules Powder Company.....	1
Houston Oil & Refining Company.....	1
Indian Refining Company.....	2
Lincoln Oil Refining Co.....	1
Marland Refining Company.....	3
Nichols Copper Company.....	1
Pure Oil Company.....	4
Roxana Petroleum Corp.....	2
Sharples Solvent Corp.....	1
Shell Company of Cal.....	2
Sinclair Refining Co.....	1
Standard Oil Co. of Indiana.....	2
Standard Oil Co. of Ohio.....	2
Standard Oil Co. of New Jersey.....	5
The Texas Company.....	3
Titanium Pigment Co., Inc.....	4
Tubize Artificial Silk Co. of America.....	5
Union Oil Co. of Cal.....	2
U.S.S.R., Moscow.....	1
Utah Oil Refining Company.....	1
Vacuum Oil Company.....	10
Westvaco Chlorine Products Co.....	1

The above installations represent a combined daily capacity of over 3000 tons of finished acid and 900 barrels of sludge. Eleven of these installations are of the SUPER VACUUM type.

INQUIRIES

The National Lead Company has the exclusive rights to build and sell concentrating plants and give licenses for the Simonson-Mantius Vacuum Process. Inquiries should be directed to the National Lead Company, Acid Recovery Department, 111 Broadway, New York.

THE NATIONAL PIPE BENDING COMPANY

Incorporated 1883.

101 River Street, New Haven, Conn.

BRANCH OFFICES

Boston, Mass.
New York, N. Y.
Philadelphia, Pa.Pittsburgh, Pa.
Baltimore, Md.
Atlanta, Ga.Cleveland, Ohio
Cincinnati, Ohio
Memphis, Tenn.Chicago, Ill.
Detroit, Mich.
Denver, Colo.Minneapolis, Minn.
Butte, Mont.
Los Angeles, Calif.

Canadian Representative: Albert G. Hill, Toronto, Ont.

PRODUCTS

Instantaneous Water Heaters (Bulletin No. 55).
Process Water Storage Heaters (Bulletin No. 68).
Feed Water Heaters (Bulletins Nos. 51A and 53).
Coils, Pipe and Tube (Bulletin No. 60).
Welded Headers (Bulletin No. 60).
Caustic Liquor Heaters (Designed to suit service).
Fuel Oil Heaters (Designed to suit service).
Preheaters.
Brass and Copper Spun Products.

SERVICE AND COOPERATION

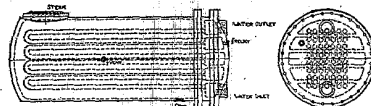
Detail information, estimates on drawings and specifications for any piece of apparatus will be gladly furnished to those who are considering the above equipment.

General information on Heaters and Coils can be obtained by writing for our condensed bulletins. They give weights and physical properties of our products and contain much valuable engineering data.

NATIONAL HOT WATER HEATERS

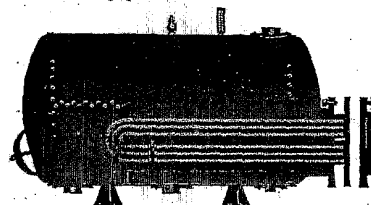
We make hot water heating units of two types, instantaneous and storage. Both types have their advantages and the installation depends upon the hot-water demand. For either exhaust or live steam.

Instantaneous Type—Heats water as it flows either continuously or intermittently. Built for steam pressures up to 75 lbs. per sq. in. U-bend copper tubes through which the water passes are fitted into a cast iron or steel shell through which the steam for heating is passed. Made in sizes from 20 to 12,000 gallons of hot water per hour at temperatures from 40° F. to 180° F.



Instantaneous Process Water Heater

Storage Type—A combination of a closed pressure vessel and a steam tube heating element. For use under conditions where the instantaneous demand for hot water exceeds the immediate steam supply. A properly proportioned hot water storage heater will insure ample hot water without increased boiler capacity in many instances. Made in horizontal and vertical type of supply from 100 to 15,000 gallons of hot water per hour, heated through standard temperature range 50 to 180° F., with steam under pressure from 0 to 100 lb. gauge.



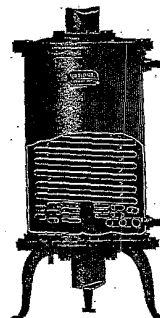
Single Element Steel Shell Horizontal Storage Heater

Note the ease with which element can be removed. These heating elements can also be supplied separately for heating tanks, vats and flowing liquids in pipes.

FEED WATER HEATERS

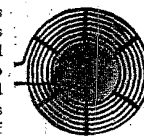
National Feed Water Heaters are made up of a cast iron, wrought iron or steel shell containing one or more helical coils of seamless copper tubing. The water is pumped through the coils, absorbing heat from the exhaust steam in the shell.

These heaters are made in sizes to provide for heating the feed water for a wide range of boiler sizes and invariably show large savings of fuel.

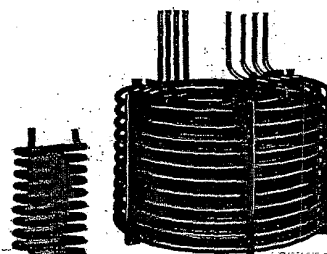
Original Coil Type Heater
Inside manifold. A type that has given efficient use for many years.

FACILITIES FOR COILS AND BENDS

All "National" Coils are continuous, without couplings or screwed fittings, unless specified. Iron and Steel Coils have electrically welded joints and all Brass and Copper Tubes have brazed joints. The National Pipe Bending Co. is prepared to submit designs, specifications and estimates covering coils and bends for the particular requirements of plant and will quote promptly on receipt of sketches and specifications. National fabricates any type of coil in Nickel, Monel, Chrome-Nickel, Chrome-Iron, Aluminum, Admiralty, Brass, Copper, Stainless Iron, Iron, Steel, and Wrought Iron Pipe, etc.



Round Flat Coil



Spiral Coil

Heated Nitrate Coil